

production of this substance from the cambium of the larch became an accomplished fact. But Tiemann was not content with this merely material success; in a masterly series of researches, the constitution of vanillin and various allied naturally-occurring compounds—the protocathechuic series—was established. Fresh syntheses of vanillin—from eugenol and from guaiacol—were also discovered.

In 1893 he published, along with Krüger, his well-known paper "On the Aroma of the Violet." It was, however, the aroma rather of the iris root or orris root (with which that of the violet may or may not be identical) that he investigated. The quantity of the odiferous principle contained in iris root is so infinitesimal, and that of the root to be extracted, consequently, so large, that, as he states, the resources of a mere scientific laboratory proved unequal to the task, and this preliminary part of the investigation had to be carried out in the works at Holzminden. The substance thus isolated was thoroughly investigated and its constitution established. In order to indicate its origin and, at the same time, its ketonic constitution, he termed it *irone*. His attempt to synthesise it was not, from the point of view of the pure chemist, successful, although for the manufacturing chemist it was of the utmost value. Starting with citral, obtained from oil of lemons or from lemon-grass oil, he condensed this substance with acetone, converting it into a compound which he termed pseudo-ionone; this, when treated with dilute sulphuric acid, yielded ionone, isomeric—not identical—with *irone*, but so closely resembling it in smell that very few people can detect the difference. For the purposes of the perfumer, therefore, ionone is every whit as good as *irone*. It is now manufactured, and the value of the process to the patentees may be judged of from the attempts that have been made to evade or to invalidate the patent—attempts that have been foiled in courts of law both in this country and in Germany.

Amongst Tiemann's numerous other researches may be mentioned his work on the terpenes, on camphor, and on the synthesis of amido-acids.

He was a brother-in-law of the late A. W. von Hofmann.

### NOTES.

AT a general monthly meeting of the members of the Royal Institution, held on Monday, the following letter from the Clerk of the Goldsmiths' Company, Sir Walter S. Prideaux, was read:—"I am directed to inform you that the attention of the Court of the Goldsmiths' Company having been drawn to the fact that the Royal Institution of Great Britain has lately celebrated its centenary, they have, in order to mark their sense of the importance of that event, been pleased to make to the Institution the further grant of 1000*l.*, for the continuation and development of original research, and especially for the prosecution of further investigations of the properties of matter at temperatures approaching that of the absolute zero of temperature. I enclose a cheque for this amount, and I shall feel obliged to you to acknowledge the receipt." The following resolution, proposed by the Lord Chancellor, and seconded by Sir A. Noble, was then passed:—"That the members of the Royal Institution of Great Britain, in general meeting assembled, having been informed that the Court of the Goldsmiths' Company have made a donation of 1000*l.* to the funds of the Royal Institution in commemoration of its centenary, and in aid of the investigations which are being carried on in its laboratories into the properties of matter at low temperatures, desire to express to the Court their profound and grateful appreciation of this second munificent manifestation of their practical interest in the work of the Institution—a manifestation which has been made on this

occasion at once reminiscent of past services to science and prescient of services yet to come."

THE Dover Town Council has received a letter from the President of the French Association for the Advancement of Science, enclosing a handsome silver medal, presented to the municipality in commemoration of the Association's visit to the town in September last. The Mayor, Sir William Crundall, said the medal would be placed with the corporation plate. It was decided to make a grateful acknowledgment of the gift.

DR. T. E. THORPE, F.R.S., has been appointed to succeed the late Sir Edward Frankland in the work of analysing the water supplied by the London water companies.

THE death is announced of Dr. Birch-Hirschfeld, professor of pathology in the University of Leipzig, at the age of fifty-seven. Prof. Birch-Hirschfeld was one of the most distinguished pathologists in Germany.

THE *British Medical Journal* states that a State Institute of Serumtherapy, Vaccination, and Bacteriology, to bear the name of Alfonso XIII., has been created in Madrid. The new institute is organised on the lines of the Institut Pasteur.

AN International Congress of Mining and Metallurgy will be held in Paris on June 18-23 next year. The congress, like that of 1889, will be under the direct patronage of the French Government. In the provisional programme the following subjects are down for discussion:—Mining: use of explosives in mines; use of electricity in mines; mining at great depths; labour-saving methods as applied to mining. Metallurgy: progress in the metallurgy of iron and steel since 1889; application of electricity to metallurgy—(a) chemical, and (b) mechanical; progress in the metallurgy of gold; recent improvements in the dressing of minerals. The general secretary is M. Gruner, rue de Châteaudun, 55 Paris.

A COURSE of twelve demonstrations will be given in the psychological laboratory of University College during the Lent Term, commencing on January 19, 1900, by Mr. W. McDougall, Fellow of St. John's College, Cambridge. The Class will meet once a week on the day and at the hour that are found to be most convenient to the majority of the students. The methods of investigating experimentally all the chief types of elementary mental process will be demonstrated, and the students will be afforded opportunities to practise the methods. The subjects will include the several aspects of skin-sensibility and the "muscular sense"; the colour sense, visual distance and optical illusions; appreciation of tone-intervals and localisation of sound; sensibility to pain; simple measurements of memory; estimation of periods of time, &c. Students should send in their names to Mr. McDougall, St. John's College, Cambridge, before Tuesday, January 16, 1900, when the Term begins.

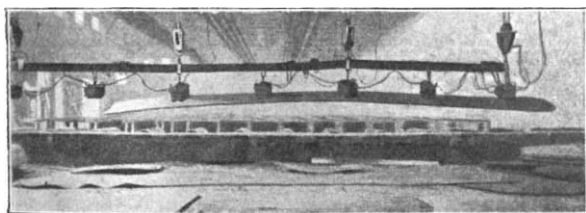
IN the early part of last week a "Bottlenose" whale was reported to have stranded on the river-bank at North Woolwich. The animal was a female, and on Wednesday, November 29, it was delivered, some time after death, of two young. On Friday a visit was made to Woolwich to see if either of the specimens were required for the Natural History Museum. That morning the carcase of the mother had, however, been towed out to sea by the sanitary authorities; but the body of a young one (which measured sixteen feet in length) was on view in front of the station, where it had attracted crowds the previous day. A glance showed that, instead of being a "Bottlenose," it was a "Finner" or Rorqual; and, since the mother was stated to have measured over sixty feet in length, there could be no doubt that it was the common species (*Balaenoptera musculus*), of which there is now a life-sized half-model in the Natural

History Museum. The young one differed from the adult in that the under-surface of the body was flesh-coloured instead of white.

We learn from a German contemporary that a complete horn—that is to say, both the horn-core and its sheath—of the Avrochs or extinct European Wild Ox (*Bos taurus primigenius*) was disinterred some years since from a peat-bog at Treten, in Pomerania, and is now preserved in the zoological museum of the high school. The specimen has been examined by Dr. A. Nehring, of Berlin, who pronounces it to be about 300 years old; it is only in peat, or in an extremely dry cave, that the conservation of horn would be possible for such a lengthened period.

OWING to the frequent settlement of the land in the salt districts it has always been found a difficult matter to maintain in proper order bridges and other similar structures. To meet this difficulty the engineer of the Weaver Navigation, in constructing two new swing bridges over the river at Northwich, has so designed these that, instead of resting on the land, the weight of the bridges is carried on steel pontoons floating in the water, and the bridges are therefore independent of any settlement of the land so far as their foundations are concerned, and they are so built as to be easily adjusted to any settlement of the ground at the two ends. These bridges also are opened and closed by electric power, being the first to be so operated in this country. The two bridges have cost 25,000*l*.

AN interesting use of electro-magnets in steel works is referred to in the *Electrical Review*. It appears that in the works of the Illinois Steel Company, which makes very exten-



Electro-magnets carrying a steel plate.

sive use of electric power for all the purposes of steel manufacture, electro-magnetic cranes are used to carry plates from the rolls to the shears. A long plate being conveyed in this manner is shown in the accompanying illustration.

MONSIEUR CHARLES JANET, President of the Zoological Society of France, has for some years been engaged in investigating the minute anatomical structure of ants, wasps, and bees. The results of his investigations are published at intervals under the title of "*Études sur les Formis, les Guêpes, et les Abeilles*"; and of these we have just received Nos. 17, 18, and 19, the last published in the *Mémoires* of the French Zoological Society for 1898. All these treat of the anatomy of different portions of the body of the Red Ant (*Myrmica rufa*). Another memoir, on the cephalic nerves of the latter insect, appears in the journal last mentioned for 1899, although not under the same general title. The work being of an extremely technical nature, its details cannot be described in a note; but we may observe that these are worth the best attention of all students of insect morphology. The illustrations alone serve to indicate the extreme care and labour that the author has devoted to his subject, the elaboration of detail being little short of marvellous.

We learn from the *Scientific American* that the Naval Board appointed to inspect and report on the performance of the

*Holland* submarine boat has reported that in the recent tests, held on November 6, in New York Harbour, she fulfilled all the requirements laid down by the Department. These requirements were that she should have three torpedoes in place in the boat, she should have all arrangements for charging torpedoes without delay, and that she should be prepared to fire a torpedo at full speed both when submerged and at the surface. Lastly, the *Holland* was to make a run for two miles under water, starting from one buoy, running submerged for a mile to a second buoy, rising to discharge a torpedo at a mark near the second buoy, and then, after diving again return submerged to the starting point. In his report Chief Engineer John Lowe, U.S.N., who was specially ordered to observe and report the preliminary trial, says: "I report my belief, after full examination, that the *Holland* is a successful and veritable submarine torpedo boat, capable of making a veritable attack upon the enemy unseen and undetectable, and that therefore she is an engine of warfare of terrible potency which the Government must necessarily adopt into its service."

THE November number of the *Journal* of the Franklin Institute contains several of the addresses delivered on the occasion of the recent celebration of the seventy-fifth anniversary of the Institute. Dr. J. W. Richards, president of the chemical section, which is the oldest of the sections, inaugurated the proceedings of the commemorative week with an address in which he showed that the Institute has always stood for the happy combination of theory and practice—the union of pure and applied science. Mr. H. W. Wiley gave an address on the relation of chemistry to the advancement of the arts. The following remark illustrates the dominant influence of chemical science in one direction: "The agricultural experiment stations of the United States which have been directed by chemists, have taken such a leading position in the development of agricultural science as to practically monopolise all those investigations which have been most useful to agriculture throughout the country." Dr. E. J. Houston gave an account of the position of electrical science at the time of the birth of the Institute, in 1824, and showed that the Institute has exerted a marked influence on the extension and application of electricity by its great international exhibition of 1824, and through other means. Mr. R. W. Pope gave an address on a similar theme, namely, the influence of technical societies in promoting the progress of the arts. All the addresses in the *Journal* are of interest in connection with the subject of the bearing of science upon industry.

THE current number of the *Lancet* contains an article of particular interest dealing with the effects upon the wounded of the Mark II., the Mauser, the Dum-dum, and the Mark IV. bullets. The article, which has been written by Dr. Arthur Keith and Mr. Hugh Rigby, gives a clear idea of the relative amount of destruction caused by each of these modern military bullets, and the experiments upon which the writers' views are founded, confirm fully the experiences which have already been reported from the seat of war in South Africa. A glance at the illustrations shows the terrible havoc wrought by the Mark IV. and Dum-dum bullets and shows also that the old Martini-Henry bullet made an enormous and jagged wound compared with the neat little track that is left behind the Mark II., which our forces are using in South Africa, or the Mauser which is being used by the Boers. Dr. Keith and Mr. Rigby have not, however, been able to obtain results in their experiments with Dum-dum bullets that endorse Prof. von Bruns's statement of the case against the English open-nosed bullet. All open-nosed bullets cause fearful injuries, but it is contended that Prof. von Bruns must have used Dum-dum bullets of an exceptional nature to get the results which he recorded.

DR. F. A. COOK, who recently returned with the *Belgica* expedition, contributes to the December number of *Scribner's Magazine* an interesting article, accompanied by a number of illustrations reproduced from photographs, on the possibilities of Antarctic exploration. He shows that important results of immediate practical use to both science and commerce are likely to be obtained by Antarctic exploration. Referring to the need for exploration merely from a geographical point of view, Dr. Cook remarks:—"The actual existence of a land corresponding to what is charted as Graham Land is a matter of considerable doubt. On the map it extends from the sixty-ninth parallel of latitude, northward four hundred miles. But Alexander I. Land, the southern termination, is an island, and we saw no land eastward. The character of the land which may or may not exist between this and the newly-discovered Belgica Strait is in doubt. It offers scientific and commercial prospects promised by no other new polar region. At the one hundredth degree of east longitude, close to the circle, there is another interruption in the unknown. This is the much disputed Wilkes Land. It is by far the largest land mass in the entire Antarctic area. Including Victoria Land, its better known eastern border, it covers more than one-sixth of the circumference of the globe. In a territory of this extent, even under the most hopeless spread of snow, would it not be strange if something of value and much of interest were not found? Enderby Land and Kemp Land furnish other problems. They are probably not fixed to the continent, for the American, Morrell, found open sea below them; but whether they are isolated islands or parts of an archipelago remains to be ascertained. Does Peter Island exist? The *Belgica* drifted close to the position assigned to it by Bellingshausen, but saw no land. These are but a few examples of the many geographical problems to be solved in the Far South."

In the *Journal de Physique* for November, M. A.-B. Chauveau discusses the diurnal variations of atmospheric electricity, to explain which no less than about thirty different theories have been proposed, of which four appeared in a single year (1884). M. Chauveau's principal conclusions, based on a comparison of curves from the Bureau central, Batavia, Sodankylä (Finland) Trappes, the College de France, and Greenwich, are as follows:—(1) That the influence of the soil which is greatest in summer (and of which the principal factor probably is the evaporation of negatively electrified water from the surface of the earth) intervenes as a disturbing cause in the diurnal variation. (2) That the general law of variation is represented by a simple oscillation having a maximum in the day, and a minimum (moreover, remarkably constant) between 3.30 and 4.30 a.m.

FROM the *Bulletin* of the French Physical Society we learn that M. Sagnac has given a theory of the propagation of light through matter which supposes that the light waves are transmitted by the same ether as *in vacuo* without the properties of this medium being in any way altered by the presence of material particles; the only effect of these is to scatter the vibrations in the same manner as small conductors, each of which reflects and diffracts all vibrations of sufficiently great wave-length. The author shows that, without introducing any electromagnetic or dynamical considerations, it is possible to give a *purely kinematical* explanation of the laws of reflection and refraction, the existence of the optic layer, and the existence of refractive indices greater than unity. M. Sagnac shows how the optic phenomena of entrainment of ether by matter can be explained by his hypothesis without the assumption of either an ether denser than the ether of a vacuum or any mechanical reaction between the ether and matter. This kinematical theory of the entrainment of the ether presents no difficulties or complications in accounting for the existence of dispersion or

double refraction; and M. Sagnac has extended the theory to the explanation of anomalous dispersion and to the investigation of certain new optic phenomena.

IN the year 1891 the Hydrographic Office of Vienna established an elaborate service of rainfall and river observations in all the principal river systems. The volumes for the year 1897 have just been published and contain results of rainfall observations for no less than 2615 stations, together with tables showing the general distribution of temperature in the Austrian Empire. The depth of snow is also regularly gauged at over 40 stations. The work is accompanied by numerous diagrams and by a general discussion of the results for each of the 14 districts into which the service is subdivided.

WE have received the *Boletín Mensual* of the Manila Observatory for the first quarter of the year 1898. It is satisfactory to note that observations have been regularly recorded at this important observatory, under the direction of the Jesuit Fathers, for the last thirty-three years. The present volume contains hourly and daily means of the principal meteorological and magnetical elements, together with maximum and minimum values for Manila, from self-recording instruments and eye observations made twice daily at a number of secondary stations in the Philippine Islands. It also contains a monthly discussion of the observations and of earthquake phenomena, with curves of the meteorological and magnetical elements.

MESSRS. BAILLIÈRE, TINDALL AND CO. have published the fourth edition of "A Synopsis of the British Pharmacopœia," compiled by Mr. H. Wippell Gadd, with analytical notes and suggested standards by Mr. C. G. Moor.

MR. A. C. SEWARD reprints from the *Proceedings* of the Cambridge Philosophical Society a paper on the Binney collection of Coal-Measure plants, in which a new genus, *Megaloxylon*, is described, belonging to the Cyadofilices, and considered by the author as furnishing an additional link between the Palæozoic representatives of this family and recent ferns. The paper is copiously illustrated.

THE sixth edition of M. Eric Gerard's "Leçons sur l'Électricité" has been published in two volumes by MM. Gauthier-Villars, Paris. The first volume deals with the general principles of electricity and magnetism, and the theory and construction of dynamo-electric machinery. The second volume is concerned with the most important industrial applications of electricity. The work has increased in size, and many new illustrations have been added.

THE additions to the Zoological Society's Gardens during the past week include a Macaque Monkey (*Macacus cynomolgus*, ♀) from India, presented by Mr. J. A. Ewen, J.P.; a Brown Capuchin (*Cebus fatuellus*) from Guiana, presented by Mr. Douglas Mason; a Badger (*Meles taxus*), British, presented by Mr. G. A. Bronson; two Golden Agoutis (*Dasyprocta aguti*) from Central America, presented by Mr. C. Bevan; a White-bellied Sea Eagle (*Haliaeetus leucogaster*) from Tasmania, presented by Captain Francis Mayor; a Common Trout (*Salmo fario*), British fresh waters, presented by Mr. Arthur Irving; a Rufous Rat Kangaroo (*Epyprymnus rufescens*, ♂) from New South Wales, two Ornamental Lorikeets (*Trichoglossus ornatus*) from Moluccas, a Banded Parrakeet (*Palaeornis fasciata*), four Starred Tortoises (*Testudo elegans*) from India, two Undulated Grass Parrakeets (*Melopsittacus undulatus*) from Australia, a Lapwing (*Vanellus vulgaris*, var.), four Bewick's Swans (*Cygnus bewicki*), European; two Wrinkled Terrapins (*Chrysemys scripta rugosa*) from the West Indies, two Emperor Boas (*Boa imperator*) from Central America, deposited.